CLAIM LISTING

1-28. (Canceled)

29. (**Currently Amended**) A machine-implemented method, comprising:

receiving a multimedia signal having data values;

forming the data values into a matrix of inputs $\underline{\mathbf{X}}$ [X];

forming a matrix $\underline{\mathbf{A}}$ [A] of predetermined values and multiplication operations;

factoring **the matrix A** [A] into a butterfly matrix $\underline{\mathbf{B}}$ [B], a shuffle matrix $\underline{\mathbf{S}}$ [S], and a multiplication matrix $\underline{\mathbf{M}}$ [M], wherein the multiplication operations are selectively positioned into pairs within [M] **the matrix M, and wherein the values within the matrices B and S are integers selected from the group consisting of 1, 0, and -1**; ~~and~~

executing a Single Instruction Multiple Data (SIMD) instruction that multiplies **the matrices X, B, S, and M** [X], [B], [S], ~~and~~ [M] together to obtain a matrix of outputs [Y]**; and**

generating a compressed multimedia signal based on the obtained output matrix Y.

30. (Previously Presented) The machine-implemented method of claim 29, wherein the SIMD instruction is a Packed Multiply and Add (PMADDWD) instruction.

31. (**Canceled**)

32. (**Currently Amended**) The machine-implemented method of ~~claim 31~~ **claim 29**, wherein **the matrix A** [A] is a 4-point Discrete Cosine Transform (DCT) transformation matrix, **the matrix X** [X] represents a time domain of a video signal, and **the matrix A** [Y] represents a frequency domain of the video signal.

33. (**Currently Amended**) The machine-implemented method of claim 32, wherein the multiplication matrix $\underline{M}$ [M] is

$$\begin{bmatrix} \dfrac{1}{\sqrt{2}} & \dfrac{1}{\sqrt{2}} & 0 & 0 \\[2mm] \dfrac{1}{\sqrt{2}} & -\dfrac{1}{\sqrt{2}} & 0 & 0 \\[2mm] 0 & 0 & \cos(\dfrac{3\pi}{8}) & \cos(\dfrac{\pi}{8}) \\[2mm] 0 & 0 & -\cos(\dfrac{\pi}{8}) & \cos(\dfrac{3\pi}{8}) \end{bmatrix},$$

and wherein the positioned pairs are $\begin{array}{c} \dfrac{1}{\sqrt{2}} \\[2mm] \dfrac{1}{\sqrt{2}} \end{array}$ and $\begin{array}{c} \dfrac{1}{\sqrt{2}} \\[2mm] -\dfrac{1}{\sqrt{2}} \end{array}$.

34. (**Currently Amended**) A machine-readable medium having instructions to cause a machine to perform a machine-implemented method, comprising:

receiving a multimedia signal having data values;

forming the data values into a matrix of inputs $\underline{X}$ [X];

forming a matrix $\underline{A}$ [A] of predetermined values and multiplication operations;

factoring **the matrix A** [A] into a butterfly matrix $\underline{B}$ [B], a shuffle matrix $\underline{S}$ [S], and a multiplication matrix $\underline{M}$ [M], wherein the multiplication operations are selectively positioned into pairs within [M] **the matrix M, and wherein the values within the matrices B and S are integers selected from the group consisting of 1, 0, and -1**; and

executing a Single Instruction Multiple Data (SIMD) instruction that multiplies **the matrices X, B, S, and M** [X], [B], [S], and [M] together to obtain a matrix of outputs [Y]**; and generating a compressed multimedia signal based on the obtained output matrix Y**.

35. (Previously Presented) The machine-readable medium of claim 34, wherein the SIMD instruction is a Packed Multiply and Add (PMADDWD) instruction.

36. (**Canceled**)

37. (**Currently Amended**) The machine-readable medium of ~~claim 36~~ **claim 34**, wherein **the matrix A** ~~[A]~~ is a 4-point Discrete Cosine Transform (DCT) transformation matrix, **the matrix X** ~~[X]~~ represents a time domain of a video signal, and **the matrix A** ~~[Y]~~ represents a frequency domain of the video signal.

38. (**Currently Amended**) The machine-readable medium of claim 37, wherein the multiplication matrix **M** ~~[M]~~ is

$$
\begin{bmatrix}
\dfrac{1}{\sqrt{2}} & \dfrac{1}{\sqrt{2}} & 0 & 0 \\
\dfrac{1}{\sqrt{2}} & -\dfrac{1}{\sqrt{2}} & 0 & 0 \\
0 & 0 & \cos(\dfrac{3\pi}{8}) & \cos(\dfrac{\pi}{8}) \\
0 & 0 & -\cos(\dfrac{\pi}{8}) & \cos(\dfrac{3\pi}{8})
\end{bmatrix},
$$

and wherein the positioned pairs are $\begin{matrix} \dfrac{1}{\sqrt{2}} \\ \dfrac{1}{\sqrt{2}} \end{matrix}$ and $\begin{matrix} \dfrac{1}{\sqrt{2}} \\ -\dfrac{1}{\sqrt{2}} \end{matrix}$.

39. (**Currently Amended**) A system comprising:

a processing unit coupled to a memory through a bus; and

a process executed from the memory by the processing unit to cause the processing unit to:

receive a multimedia signal having data values;

form the data values into a matrix of inputs **X** ~~[X]~~;

form a matrix **A** ~~[A]~~ of predetermined values and multiplication operations;

factor **the matrix A** ~~[A]~~ into a butterfly matrix **B** ~~[B]~~, a shuffle matrix **S** ~~[S]~~, and a multiplication matrix **M** ~~[M]~~, wherein the multiplication operations are selectively positioned into pairs within ~~[M]~~ **the matrix M, and wherein the values within the matrices B and S are integers selected from the group consisting of 1, 0, and -1**; ~~and~~

execute a Single Instruction Multiple Data (SIMD) instruction that multiplies **the matrices X, B, S, and M** ~~[X], [B], [S], and [M]~~ together to obtain a matrix of outputs ~~[Y]~~**; and generate a compressed multimedia signal based on the obtained output matrix Y**.

40. (Previously Presented) The system of claim 39, wherein the SIMD instruction is a Packed Multiply and Add (PMADDWD) instruction.

41. **(Canceled)**

42. **(Currently Amended)** The system of ~~claim 41~~ **claim 39**, wherein **the matrix A** ~~[A]~~ is a 4-point Discrete Cosine Transform (DCT) transformation matrix, **the matrix X** ~~[X]~~ represents a time domain of a video signal, and **the matrix A** ~~[Y]~~ represents a frequency domain of the video signal.

43. **(Currently Amended)** The system of claim 42, wherein the multiplication matrix **M** ~~[M]~~ is

$$
\begin{bmatrix}
\dfrac{1}{\sqrt{2}} & \dfrac{1}{\sqrt{2}} & 0 & 0 \\
\dfrac{1}{\sqrt{2}} & -\dfrac{1}{\sqrt{2}} & 0 & 0 \\
0 & 0 & \cos(\dfrac{3\pi}{8}) & \cos(\dfrac{\pi}{8}) \\
0 & 0 & -\cos(\dfrac{\pi}{8}) & \cos(\dfrac{3\pi}{8})
\end{bmatrix},
$$

and wherein the positioned pairs are $\begin{matrix}\dfrac{1}{\sqrt{2}} \\ \dfrac{1}{\sqrt{2}}\end{matrix}$ and $\begin{matrix}\dfrac{1}{\sqrt{2}} \\ -\dfrac{1}{\sqrt{2}}\end{matrix}$.

44. **(Currently Amended)** The method of claim 29, wherein the butterfly matrix **B** ~~[B]~~ is of the form

$$
\begin{bmatrix}
1 & 0 & 0 & 1 \\
0 & 1 & 1 & 0 \\
0 & 1 & -1 & 0 \\
1 & 0 & 0 & -1
\end{bmatrix}.
$$

45.   (**Currently Amended**) The machine-readable medium of ~~claim 36~~ <u>claim 34</u>, wherein the butterfly matrix <u>**B**</u> ~~[B]~~ is of the form

$$\begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & -1 & 0 \\ 1 & 0 & 0 & -1 \end{bmatrix}.$$

46.   (**Currently Amended**) The system of ~~claim 41~~ <u>claim 39</u>, wherein the butterfly matrix <u>**B**</u> ~~[B]~~ is of the form

$$\begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & -1 & 0 \\ 1 & 0 & 0 & -1 \end{bmatrix}.$$